



EVALUATION OF INTERCEPT BARRIER MATERIAL FOR MILITARY PACKAGING

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EVALUATION OF INTERCEPT BARRIER MATERIAL FOR MILITARY PACKAGING

OBJECTIVE:

- **Identify, Test, and Evaluate Commercially Available Barrier Materials to:**
 - **meet military packaging requirements,**
 - **provide longer shelf-life, and yet be cost-effective and environmentally-friendly**



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SUMMARY:

Identified Several Barrier Materials/Systems:

- **Flexible barrier material (INTERCEPT developed by Lucent Technologies).
Currently fielded MIL-PRF-131, and VCI-coated materials were used for comparison in tests**
- **Rigid barrier (plastic-desiccant, Intercept-coated corrugated plastic) systems**



EVALUATION OF INTERCEPT BARRIER MATERIAL FOR MILITARY PACKAGING

SUMMARY continued

INTERCEPT Characteristics / Advantages:

- Available as : Static Intercept, Static foil, and corrugated plastic.
- Multi-protection measures are combined in one flexible material to protect metal components.
- Protection provided by sacrificial Copper, does not shed particles/outgas; no cleaning required. One-mil thick Inter-cept material can protect multi-metal items for ten years; less inspections and associated labor and material costs. Non-toxic,⁴ environmentally friendly, reusable



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SUMMARY continued

Following Tests/Analyses were conducted:

- **Water Vapor Transmission Rate(WVTR) test and Material Strength tests**
- **Salt-fog test (with Steel, Brass, Al, Zinc coupons)**
- **Rough Handling tests, Compatibility tests with energetics, and Field test**
- **Accelerated aging for life prediction**
- **Cost-benefit analysis.**



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EVALUATION OF TEST RESULTS:

- Material Strength Properties, WVTR test results
indicate that INTERCEPT properties are comparable to MIL-PRF-131 material.
- Salt-fog test results indicate that INTERCEPT
material and plastic-desiccant system both provide longer corrosion protection than with MIL- PRF-131 barrier material.



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SALT-FOG Test Data Comparison

<<<<< Days of protection against corrosion
>>>>>>>

Metal coupon	Intercept Static 4-mil	Intercept Poly 4-mil	VCI-126 4-mil	MIL-PRF-131 5-mil
Steel	58	102	28	62
Aluminum	58	130	59	91
Brass	58	130	28	91
Zinc	91	97	59	77



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EVALUATION continued

- Rough handling and Field test results indicate that INTERCEPT material yield similar results as with MIL-PRF-131 material.
- INTERCEPT (static foil) material was determined compatible with several energetics. Must avoid using INTERCEPT with detonators having Lead Azide.
- Accelerated aging test results indicate acceptable level of deterioration in heat seal seam strength of several barrier materials tested.

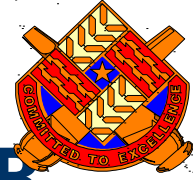


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EVALUATION continued

- Cost analysis: Cost components are Material, Labor, Miscellaneous.
- Material cost: (roll of 3 feet x 600 feet)

MIL-PRF-131	\$ 150.00 per roll
INTERCEPT (static)	\$ 200.00 per roll
INTERCEPT (foil)	\$ 360.00 per roll



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COST ANALYSIS continued:

- Labor cost is \$70.00/hour for vacuuming, bag sealing, cleaning of item prior to its use, disposal.
- Miscellaneous cost varies on specific packaging application. It consists of cost of additional wrap material, cleaning material, mitigating hazardous/toxic nature of barrier material and disposal cost.



EVALUATION OF INTERCEPT BARRIER

MATERIAL FOR MILITARY PACKAGING CONCLUSIONS:

- Several alternative barrier materials/system have shown better performance in corrosion protection than MIL-PRF-131 material.
- One mil thick INTERCEPT can protect multi-metal components for ten year period against corrosion; less inspection/labor/disposal.
- Total cost of a packaging with INTERCEPT can be lowered in specific applications without compro-mising performance. Net¹¹ saving being realized by eliminating



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INTERCEPT applications:

- **Packaging of Sensitive Electronic assemblies, Circuit cards, Inter plant shipment of metallic components.**
- **Packaging two-cylinder engine blocks for the US Army.**
- **Packaging fuses and ammunitions to eliminate any out-gassing situation.**



EVALUATION OF INTERCEPT BARRIER MATERIAL FOR MILITARY PACKAGING

FUTURE EFFORT:

- **Generate Engineering Change Proposal (ECP) and a Performance Specification to insert Intercept in military packaging.**